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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR       | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------------|---------------------|------------------|
| 10/732,880   | 12/10/2003  | Miguel Angel Camacho-Lopez | KNST 2 00018        | 6839             |
| 27885  | 7590        | 01/19/2006                 | EXAMINER            |                  |
| FAY, SHARPE, FAGAN, MINNICH & MCKEE, LLP<br>1100 SUPERIOR AVENUE, SEVENTH FLOOR<br>CLEVELAND, OH 44114 |             |                            | WU, SHEAN CHIU      |                  |
|  |             |                            | ART UNIT            | PAPER NUMBER     |

1756

DATE MAILED: 01/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/732,880

Applicant(s)

CAMACHO-LOPEZ ET AL.

Examiner

Shean C. Wu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-9, 11-13, 15 and 17-31 is/are rejected.
- 7) ☒ Claim(s) 6, 10, 14 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/10/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The notation 'X' in the formula is not defined.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1, 3-5, 7, 9, 11-12, 15 and 30 are rejected under 35 U.S.C. 102(a) as being anticipated by Camacho-Lopez et al. (The first World Congress on Biomimetics & Artificial Muscles, 2002).

The reference discloses a fascinating interaction between light and liquid crystal elastomers doped with azo dyes floating on the surface of a liquid when exposed to laser light (electromagnetic radiation source), which reads on the claim language of the present invention: inducing movement by providing a liquid crystal elastomers in contact with a fluid. The samples further change their conformation and position (shape change due to the movement) by swimming away from the light. The reference anticipates the claimed invention.

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4. Claims 1, 3-5, 7-9, 11-12, 15, 17-22 and 29-30 are rejected under 35 U.S.C. 102(a) as being anticipated by Material Science "Crystal Swims like a fish to escape from laser light".

The reference discloses a fascinating interaction between light and liquid crystal elastomers doped with azo dyes floating on the surface of a liquid when exposed to laser light (electromagnetic radiation source), which reads on the claim language of the present invention: inducing movement by providing a liquid crystal elastomers in contact with a fluid (ethyl alcohol). The samples further change their conformation and position (shape change due to the movement) by swimming away from the light. See Figures and the experiment described in the content. The reference clearly anticipates the claimed invention.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 13, 23-28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Material Science as applied to claims 1, 3-5, 7-9, 11-12, 15, 17-22 and 29-30 above, and further in view of Finkelmann et al. (Physical Review Letters, 2001).

The reference of Material Science does not disclose the liquid crystal elastomer of the present invention. Finkelmann discloses nematic elastomers, which have the

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remarkable property of being able to change their shape by up to 400% in a relatively narrow temperature interval. Because the remarkable property of Finkelmann, it would have been obvious to those skilled in the art to take advantage of the Finkelmann finding by using these materials in the reference of Material Science teaching to arrive at the claimed invention.

With respect to claim 23, the reference teaching of liquid-propulsion crystal, it would have been obvious to those skilled in the art to apply the present apparatus as a peristaltic pump.

***Allowable Subject Matter***

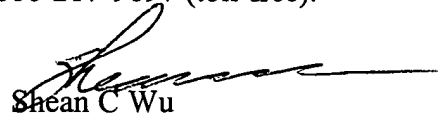
7. Claims 6, 10, 14 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shean C. Wu whose telephone number is 571-272-1393. The examiner can normally be reached on 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Shean C Wu  
Primary Examiner  
Art Unit 1756

SCW